

Case Study

Contact

Paul Morrison

Key Account Manager
at Acrovision

Email:
info@acrovision.co.uk

Acrovision provide a state-of-the-art Deep Learning vision solution for Toyota Motor Manufacturing UK LTD

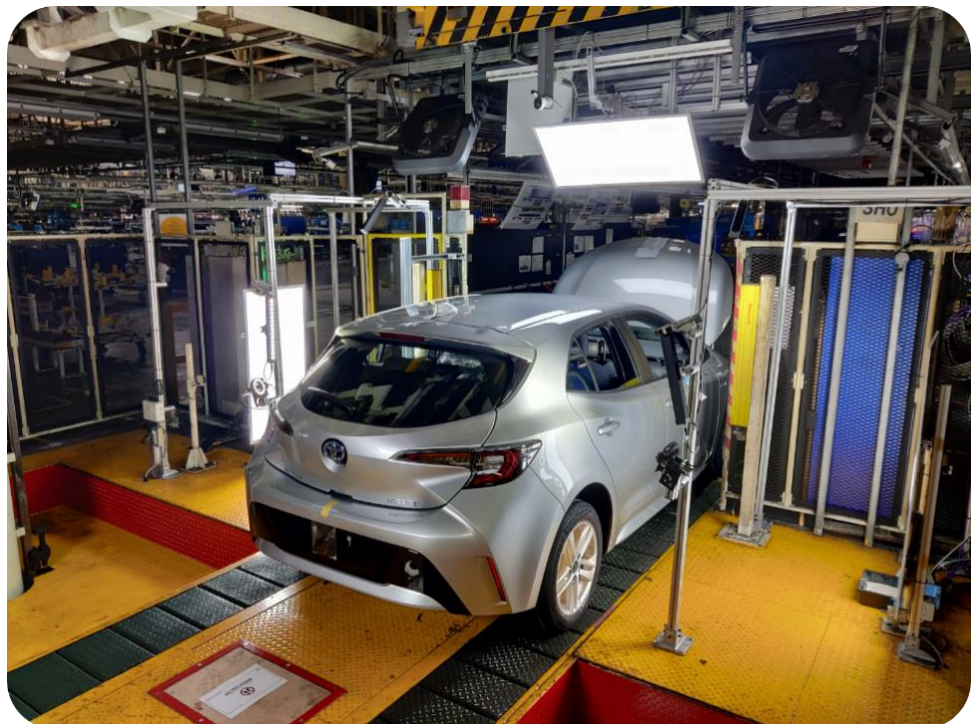
About

Toyota is a multinational automotive manufacturer and is the second largest in the world. Toyota produce more than 10 million vehicles per year and is the market leader in hybrid electric vehicles.

Acrovision, one of the UK's leading suppliers of Automatic Identification and Vision solutions, were asked by Toyota's manufacturing plant in the UK to provide an automated inspection system to replace, automate and enhance the current manual inspection process to improve quality reliability and efficiency.

After vehicle assembly, the quality and specification of the vehicle is assured by team members before passing vehicles onto the dealership. The requirements were for Acrovision to enhance this inspection process to include the following:

- An Automated Inspection system to replace current manual inspection
- For the data to communicate directly with Toyota's tracking system
- The system to hold up to 50 vehicle body numbers in advance of inspections
- That the use of AI / Deep Learning technology would benefit these inspections
- The ability to install the system during limited line-availability



Business challenge

A Toyota team member would previously carry out manual specification checks on a vehicle. They would know the vehicle specification based on the broadcast data. The Team member would then inspect the parts fitted on the vehicle based on the specification data. They would then walk around the vehicle to check every item is correct. As this method was time consuming, it was proposed that Acrovision's automated solution would speed up the time to inspect vehicles by automating the specification check process that is currently carried out manually. Toyota required the system to implement more than 80 auto specification checks.



Acrovision solution

Acrovision recognised that replacing a human decision-making process could not be achieved using traditional "rule-based" camera technology. The development of AI or Deep Learning vision has enabled vision inspection solutions to work more like a human brain by using neural network training of good / bad examples.

Acrovision therefore designed a solution using a combination of Cognex's VisionPro PC Vision platform and ViDi Deep Learning tools, to create a bespoke offering with a customised front-end. This would communicate directly with Toyota's host tracking system via broadcast messaging providing the required individual vehicle information, which in turn determines what inspections are required for that particular vehicle.

This solution consisted of 17 x GiGi PC Cameras with external lights, which are fitted onto the inspection line. As the vehicle moves along the track, the cameras are triggered multiple times to acquire images of the various inspection areas. These images are communicated back to the central PC for processing and decision making using a combination of the VPro and Deep Learning ViDi tools.

All relevant data is fed back to Toyota's tracking system for logging of results / defects. This triggers any faulty vehicles to be removed at the next checkpoint for corrections to be made.

Details

Body No. 582

Seq 582

VIN

Colour Code 040

Colour Desc SUPER WHITE 2

Type H

Engine 1.8L Hybrid

Brand D

Time: 1 / 1

Inspection: 1 / 1

Item

Car 804

Seq 804

Colour Code 040

Colour Desc SUPER WHITE 2

Brand D

Car (+1)

Seq (+1) 805

Colour Code (+1) 3U5

Colour Desc (+1) **EMOTIONAL RED 2**

Brand (+1) D

GALC V/C Data: 242

Vehicle List

Vehicle Summary

OK: 61
NG: 0
Log in

Item	RSC	AI	Expected
LH FENDER BADGE		HYBRID	HYBRID
RH FENDER BADGE		HYBRID	HYBRID
H/L CLEANER RH		---	---
H/L CLEANER LH		---	---
RR EMBLEM		BLUE	BLUE
LH FENDER GARNISH		CHROME	CHROME
RH FENDER GARNISH		CHROME	CHROME
LH FOGLAMP		WITH	WITH
RH FOGLAMP		WITH	WITH
HOOD INSULATOR		WITHOUT	WITHOUT
FR DR FRAME MOULDS LH		CHROME	CHROME
RR DR FRAME MOULDS LH		CHROME	CHROME
FR B-PILLAR MOULDS LH		GLOSS	GLOSS
RR B-PILLAR MOULDS LH		GLOSS	GLOSS
FR DR FRAME MOULDS RH		CHROME	CHROME
RR DR FRAME MOULDS RH		CHROME	CHROME
FR B-PILLAR MOULDS RH		GLOSS	GLOSS
RR B-PILLAR MOULDS RH		GLOSS	GLOSS
RH A-PILLAR GARN COLOUR		BLACK	BLACK
LH A-PILLAR GARN COLOUR		BLACK	BLACK
RH A-PILLAR SPEAKER		---	---
LH A-PILLAR SPEAKER		---	---
RADAR/RAD EMBLEM		WITH & BLUE	WITH & BLUE

Current Vehicle: 22877

Current seq: 582

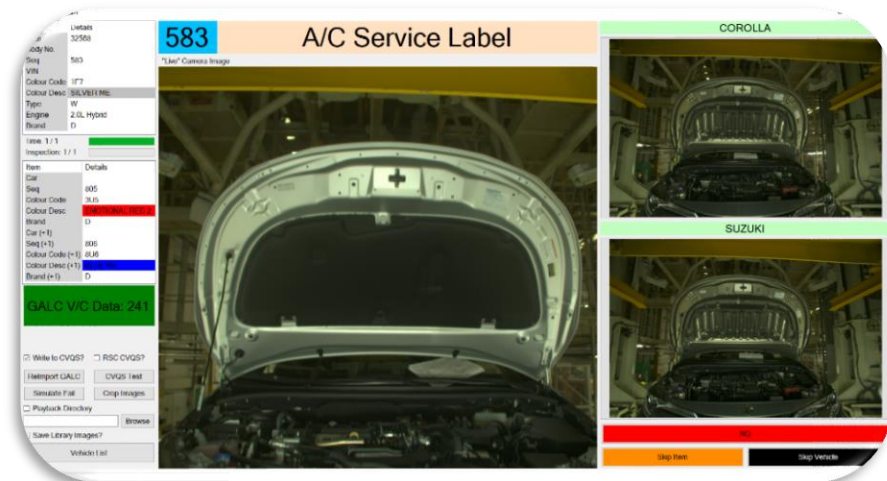
Next Vehicle: 22836 ->

Next seq: 583

Result

Toyota now have a fully working solution which automates their vehicle inspection checks – there is now no requirement for a team to be moving around the vehicle to carry out these tasks.

The solution was designed to enable Toyota to add new or edit existing inspections. In-depth training was provided to facilitate this.



Due to the success of this installation, which has now been successfully working for a few months, Toyota have already purchased a second system and is looking to implement similar Deep Learning technology for various other project ideas.

This bespoke project implementation has further enhanced the strong relationship that has developed between Acrovision and Toyota over the past few years.

Comments

Paul Morrison, Key Account Manager at Acrovision added, “Fulfilling the customer requirements for this solution, had many difficult elements with the communication to the host and tracking of data. This was made easier by the relationship with Toyota and the willingness to find suitable developments with ourselves to these challenges. The final bespoke system that has been provided, gives the automated inspection required and ease of use for Toyota. The flexibility of the system allows Toyota to make changes when required and quickly.”

Marios Souza, Engineer at Toyota Manufacturing UK added, “Throughout the last few years, we have developed a close working relationship with Acrovision and selecting them to deliver this innovative, bespoke and challenging system was the right choice. From concept development to day-to-day problem solving, Acrovision engineers always go above and beyond to support TMUK. We have now increased our quality and productivity while decreasing cost and I am more certain than ever that our customers receive the highest quality vehicles.”